

A NEW SPECIES OF *Gomphocythere* (LIMNOCYTHERIDAE, OSTRACODA)  
FROM AUSTRALIA

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**Abstract**

*Gomphocythere australica* sp. nov. is described, and the chemical characteristics of the environment briefly discussed and compared with the data available for other species.

**Introduction**

Sars (1924) established the genus *Gomphocythere* to accommodate two African species, *G. obtusata* (Sars) and *G. expansa* Sars. The former had originally been placed by Sars (1910) in the genus *Limnocythere*. Subsequently, seven more species have been described from South Africa (Müller 1921, Lowndes 1932, Klie 1939, 1944, Rome 1962), two species from New Zealand (Brehm 1932, 1939, Hornibrook 1955, Barclay 1968), one from Argentina (Ferguson 1967), and one undescribed species reported from Tasmania (McKenzie 1966). Quite recently, two more undescribed species have been recorded from South Australia.

The present paper describes *Gomphocythere australica* sp. nov. collected by the author from Lake Purrumbete, a volcanic maar, 10 km east of Camperdown in the Western District of Victoria. The first record of *Gomphocythere* from the mainland of Australia is that of Chapman (1967, p. 4, footnote). In a collection of more than 4,560 specimens, the sex ratio was found to be almost 1:1. The presence of males and females throughout the year indicates that reproduction is by syngamy (Kesling 1956). Dissections of ovigerous females have revealed juveniles up to the second larval stage. Relevance of *Gomphocythere* to the hypothesis of Continental Drift has been discussed by McKenzie & Hussainy (1968).

Specimens were collected and preserved in 70% alcohol. Appendages were cleared and mounted in polyvinyl alcohol with chlorozal black. Fig. 1-14 were drawn using a camera lucida.

**Systematics**

Family LIMNOCYTHERIDAE Klie 1938

Subfamily LIMNOCYTHERINAE Sars 1925

Type-genus *Gomphocythere* Sars 1924

Type-species *Gomphocythere obtusata* (Sars 1924)

(*Limnocythere obtusata* Sars 1910)

*Gomphocythere australica* sp. nov., Fig. 1-14

**MATERIAL EXAMINED**

Lake Purrumbete: 25 ♂, 20 ♀, 31.7.67; 21 ♂, 30 ♀, 14.4.68; coll. S. U. Hussainy.

**TYPE MATERIAL**

Holotype ♀, allotype ♂, Paratype 20 ♀, 20 ♂; National Museum of Victoria

Reg. No. J-194., J-195., J-196 respectively. Holotype and allotype are mounted on microslides. Paratypes are preserved in 70% alcohol.

#### TYPE LOCALITY

Lake Purrumbete, Victoria, Australia.

#### DIAGNOSTIC CHARACTERS

Shell of female much larger than that of male, with expanded posterior region for retention and incubation of eggs; ventral surface of shell in both sexes flattened and defined on each side by slightly projecting longitudinal ridge; caudal rami consisting of two thin lamellae each terminating in digitiform pointed lappet with plumose seta at base, posterior edge of each lamella with three short ciliated lobules; copulatory organ of male much larger than other appendages, terminating in irregular quadrangular plate.

DESCRIPTION OF FEMALE (all the drawings are made from the holotype).

*Size*: length of shell 0.86 mm, height 0.44 mm, width 0.36 mm. Shell rather tumid; seen laterally (Fig. 1) valves irregularly oval with broadly rounded anterior and posterior margin; maximum height 0.56 times length; dorsal margin slightly curved, forming an angular bend just above the eye; ventral margin slightly sinuate in front of the middle; posterior region more tumid than anterior; greatest width viewed dorsally (Fig. 2) 0.66 times length; shell surface reticulated; long hairs along margins except dorsally; anterior margin bearing row of radial pore canals (Fig. 3). Colour of shell: fuscous brown.

*Antennule* (Fig. 4): six-segmented, rather stout, proximal two segments largest; distal segment prolonged, armed at tip with sensory club fused basally with an adjacent seta 0.25 times longer than club.

*Antenna* (Fig. 5): four-segmented, natatory setae absent; two-segmented flagellum almost reaching end of claws; claws short and three in number.

*Mandible* (Fig. 6): strongly toothed; exopodite bearing three plumose setae, two lateral, one terminal.

*Maxilla* (Fig. 7): with two-segmented maxillary palp, but segmentation not clear; branchial plate with 16 vibratory lobes with plumose setae.

*Thoracic legs*: third, fourth and fifth (Fig. 8, 9, 10) similar and of slender construction; each terminating in a claw. Caudal rami (Fig. 11) typical of the genus.

DESCRIPTION OF MALE (all the drawings are made from the allotype).

Shell (Fig. 12) smaller than female, compressed, tubercles absent; in dorsal view, posterior region not expanded; ventral ridges strongly developed; copulatory organ (Fig. 13) well developed; penis with a series of chitinous bands, produced terminally to a beak-shaped projection. Length of valve 0.70 mm, height 0.3 mm, width 0.36 mm.

#### DISCUSSION

*G. australica* sp. nov. agrees with the generic description of Sars (1924). The principal differences between species of the genus lie in shell characteristics. As seen in Table 1, *G. australica* is comparable with *G. duffi* Hornibrook and *G. obtusata* (Sars) in length. However, *G. australica* differs from *G. duffi* and *G. obtusata* in the shape of the carapace and in the shape of the male genitalia. A prominent reticulated tubercle is present at the postero-dorsal margin of *G. duffi* which is absent in *G. australica*. The shape of the carapace of *G. duffi* is sub-quad-

rate; it is more ovate in *G. australica*. The shell of *G. australica* is more tumid than *G. obtusata*. The anterior portion of male genitalia in *G. obtusata* is more quadrate than in *G. australica*. On the basis of these differences, there seems to be adequate justification for erecting a new species for the present material.

### Ecology

*Gomphocythere* is primarily a freshwater genus. Of the 15 species known so far, only one species has been recorded in waters with total dissolved solids



FIG. 1-14—(1) Female carapace, left valve, outer view; (2) Female carapace, dorsal view; (3) Female right valve, anterior portion, inner view; (4) Antennule; (5) Antenna; (6) Mandible; (7) Maxilla; (8) Thoracic leg 1; (9) Thoracic leg 2; (10) Thoracic leg 3; (11) Furca of female; (12) Male carapace, ventral view; (13) Male copulatory organ; (14) Female left valve, ventral view.

TABLE 1  
List of known species of *Gomphocythere*, including data on comparative length of males and females, and on chemical nature of environment

Species	Length of male (mm)	Length of female (mm)	Locality	Country	Total dissolved solids in p.p.m.
<i>G. obtusata</i>	0.70	0.8	Duck-pond at Salt River, Victoria	South Africa	*
<i>G. expansa</i>	0.69	0.77	Pond on the Capeflat	South Africa	†
<i>G. angulata</i>	0.63	0.70	Lake Zwai, Hora Harasadi	South Africa	1940
<i>G. cristata</i>	0.50	0.54	Tanganyika	East Africa	420
<i>G. alata</i>	—	0.46	Tanganyika	East Africa	420
<i>G. simplex</i>	—	0.45	Tanganyika	East Africa	420
<i>G. tenuis</i>	—	0.44	Tanganyika	East Africa	420
<i>G. curta</i>	—	0.41	Tanganyika	East Africa	420
<i>G. angusta</i>	0.70	0.82	Weedy ponds, high mountains, Kenya	East Africa	†
<i>G. problematica</i>	—	1.00	Waimate Gorge, weedy pool	New Zealand	†
<i>G. duffi</i>	0.68	0.89	Pyramid Valley Swamp	New Zealand	†
<i>G. argentinensis</i>	0.90	1.05-1.08	Madrejon Flores base in the environ of Sante Fe	New Zealand	†
<i>G. australica</i>	0.70	0.86	Lake Purumbete, Victoria	Argentina	†
<i>Gomphocythere</i> sp.	—	—	Culvert Lagoon, Tasmania	Australia	425
				Australia	6,800

\* T.D.S. data not available but  $K_{20} = 96 \mu\text{mhos}$ .

† T.D.S. data not reported.

(T.D.S.) above 3.0% (*Gomphocythere* sp. from the Culvert Lagoon, Tasmania). The T.D.S. of Culvert Lagoon at the time of collection of this species was 6.8% (McKenzie 1966). Earlier records show that this value is unusually high for Culvert Lagoon—T.D.S. values of 3.52% in 1961 and 4.52% in 1962 have been recorded (Williams 1964). Available chemical data for the environment of the species is shown in Table 1. The genus is confined to the Southern hemisphere.

*G. australica* is endobenthic in habit. The associated microfauna includes *Candonocypris assimilis* Sars, *Cypridopsis* sp., *Cypretta viridis* King, *Diacypris* sp., *Newhamia fenestrata* King and *Macrothrix spinosa* King.

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